Proventricular Nematode Infection in Captive Finches caused by *Synhimantus* sp.

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INTRODUCTION

Synhimantus sp. (some species formerly known as *Dispharynx* sp.) are a spiruroid/acuaroid nematode parasite of worldwide distribution and with a wide host range. Numerous species are described in a range of psittacines, passerines, columbiformes, waterbirds and galliformes in the wild but instances in captive birds are less prevalent. The following case study represents a case of parasitism by *Synhimantus* sp.in captive finches and other birds in an Australian aviary.

Proventricular or ventricular parasitism in Australia is usually associated with infection by *Acuaria* sp.. In finches, *Acuaria skrjabini* is most common but other *Acuaria* sp. can infect Australian bushlarks, trillers, thrushes, flycatchers, whistlers, shrike thrushes, honeyeaters, magpies, currawongs and corvids. *Synhimantus* sp. (*Dispharynx* sp.) have been recorded in Australia in pelicans, peregrine falcons, white backed magpies and house sparrows.

Worms of these species burrow into the glands and mucosa of the proventriculus and the koilin and mucosa of the ventriculus. The burrowing is initiated by the larvae. The adults then live deeply in the proventricular or ventricular lining or live on the mucosal surface of these organs. Deep burrowing causes necrosis and reactive fibrosis of the damaged tissue. If damage is severe it will cause disruption of koilin, ulceration, haemmorhage and blood staining of ingesta and droppings. This damage subsequently causes anorexia, passing of whole seeds in the droppings, weight loss and death. This is the clinical picture most often seen with *Acuaria* sp. . In the case being presented there were significant variations to this clinical picture.

Synhimantus sp can be distinguished microscopically from *Acuaria* sp. by the structure of the ridge like ornamentations (called cordons) on the anterior end of the worm. These are weakly recurrent in *Acuaria* spp. and strongly recurved in *Synhimantus* spp. .

Both worm species require insect intermediate hosts (ants and cockroaches are suspected) and ellipsoid, embryonated, smooth , colorless, thick shelled eggs are passed in the faeces.

CASE STUDY

This case occurred in a mixed finch aviary in South East Queensland. It is a planted aviary, 6m x 3m in size and part of a larger complex of 14 aviaries. Deaths were not recorded in other aviaries at this time. Birds were fed ad lib seed and finch crumbles, a softfood mix comprising soaked or sprouted seed mixed with a commercial high protein mix, and live food comprising commercially

produced mealworms and home bred Bush fly larvae. The species in this aviary are listed below. The other aviaries contained other native and foreign finch species, foreign softbills and quail.
The aviary contained :
Red Faced Parrot finches (*Erythrura psitticae*)
Red Shouldered Whydahs (*Euplectes axillaris*)
Golden Song Sparrows (*Passer luteus*)
Longtail Grassfinches (*Poephila acuticauda hecki*)
Red Cheeked Cordon Bleu finches (*Uraeginthus bengalis*)
Red Billed Fire Finches (*Lagnostica senegala*)
Little Green Singing Finches (*Serinus mozambicus*)
Pelzeln's Saffron Finches (*Sicalis flaveola pelzelni*)
Red Chested Button Quail (*Turnix pyrrothorax*)

The aviary is well managed with routine random faecal screens performed every three months. This aviary had previously only had occasional problems with coccidiosis.

Dead birds were presented having died acutely with minimal previous clinical signs. Some birds were feeding young at the time of death.

Faecal smears of the remaining aviary occupants (presented after the 3rd bird had died) revealed low levels of embryonated eggs thought to be that of *Acuaria* sp.. From a smear made from 20 random droppings, only two of these ova were noted. No flotation was carried out. No other parasites or problems were noted.

Over a period of 1 week, four birds had died and had been stored refrigerated. The gross PM results of these birds were as follows:

- Red Faced parrot finch, female. – Body score 4/5, abdomen distended, examination reveals NAD liver, kidneys , spleen. Intestines autolyzed but coccidia 1+ noted on fresh smear. Proventriculus occupying 50% of abdominal cavity. Proventriculus wall thickened and white. Ventriculus NAD.
- Red Faced parrot finch, male – Body score 3/5, otherwise as above, intestines filled with whole seed.
- Red Billed Firefinch, female – Body score 3/5, otherwise as in (1) above.
- Red Chested button Quail, male – Body Score 4/5, thick tenacious mucous in oral cavity, otherwise as in (1) above.

The proventriculus and ventriculus of all birds were examined more closely and revealed the following :

Proventriculus distended to 3-4 times normal size, walls thickened and pale, contents consistent with diet with some black/red material consistent with blood, multiple embedded worms approximately 5-10 mm long encircling the junction of the proventriculus and ventriculus. The worms were embedded in the thickened mucous membrane. Approximately 30 –150 worms were found in each bird. The ventriculus was largely unaffected with minimal disruption of the koilin layer.

All aviaries were subsequently treated with Moxidectin 2g/l (Moxidectin Worming Medication, Australian Pigeon Company) by adding it to their drinking water at a rate of 5 ml per litre water and allowing 1.5 ml of medicated water per finch . Medicated water was supplied until all was

consumed. Withholding water from 5pm the previous afternoon and placing the medicated water in at 9am increased acceptance. This was repeated 3 times at 4 weekly interval. No further deaths occurred in this or adjacent aviaries. Aviaries were also sprayed with a commercial "bird-safe" insecticide.

DIFFERENTIAL DIAGNOSIS

This case poses an interesting differential diagnosis situation. In the live bird, a history of acute death with distended abdomen, possible passing of whole seed, possible tenacious oral mucous in a mixed collection includes :

Acute toxicosis
Candidiasis
Acuaria sp. infection
Megabacteriosis (Avian Gastric Yeast)
Bacterial infection (gastrointestinal or systemic)
Trichomoniasis
Oesophageal Capillariasis
Egg binding
Visceral neoplasia
PDS (Proventricular Dilatation Syndrome)

At gross post mortem, with a distended proventriculus, whole seed in the intestine and oral mucous, the differentials would include :

Candidiasis
Acuaria sp. infection
Megabacteriosis (Avian Gastric Yeast)
Bacterial infection (gastrointestinal or systemic)
Trichomoniasis
Oesophageal Capillariasis
PDS

PARASITE IDENTIFICATION

The parasite is still being fully identified at the time of submission of this paper. Further details will be presented at the conference.

Genus - *Synhimantus*
Species – still being identified
Size – 5-9 mm long
Eggs – 25-30 um x 20 um

The appearance of this parasite is similar to that of Acuaria sp. seen in finches but the location is unique. The individual worms appear plumper than Acuaria sp. and are embedded in the mucosa of the proventriculus rather than between the ventricular muscle and the koilin layer.

The eggs are more round than those of *Acuaria skrjabini* which are 25-30 um x 15-17 um.
It is important that , like other *Synhimantus* sp., this species has infected passerines and gallinaceous birds. As psittacines were not kept in this collection it is not certain than they may also be a host, as occurs overseas. Another case in South East Queensland included infection of finches and Columbiformes but psittacines within the aviary were not identified as clinically infected (Terry Martin, pers comm..).

HISTOPATHOLOGY

Unfortunately at the time of paper submission, histopathology results were not yet available but will be presented at the conference.
In overseas cases, histopathology has been referred to as :
An adenomatoid hyperplasia of the proventricular mucosa with the adult nematodes found in crevices in the proliferative mass.

DISCUSSION

This case revealed a clinical syndrome in a mixed finch aviary with multiple common differential diagnoses and an unexpected final diagnosis.
As *Synhimantus* sp. is not considered as an expected worm species in Australian aviaries, we must consider the following possible origins of this infection :

> This parasite may have been introduced by wild passerines (and this may be clearer once the species is known) as the aviaries are surrounded by extensive gardens and adjacent aviaries contain wild sourced Skylarks and a juvenile Eastern Whipbird being rehabilitated by this owner.
> This parasite may be a foreign species introduced with the plethora of foreign softbill and finch species that have entered this country in the past 6 years. This breeder maintains several softbill species that could possibly have been bred from this “introduced” stock.
> This parasite may have been spread from adjacent aviaries or outside this aviary due to a problem with escaped Speckled Feeder Roaches (*Nauphoeta cinerea*) that had colonised nest boxes in this aviary.

The implications for the recognition of this clinical syndrome in Australian aviaries is as follows:

> Important new differential diagnosis for birds with acute death, maldigestion and swollen abdomens.
> Mixed species infections (particularly **if** psittacines can be infected) creates important differential dilemmas for exotic diseases as one can expect the radiographic and gross post mortem appearance of this parasite to mimic that of Proventricular Dilatation Syndrome in psittacines.
> Antemortem diagnosis may be hindered by the possible low numbers of eggs passed by the worms as is seen with *Acuaria* spp.. Screening is better done using faecal flotation rather than faecal smears.

The lack of premonitory signs and fair body condition of these birds may suggest that the cause of death is acute starvation due to proventricular blockage from the proliferative reaction rather than from progressive causes. A smaller number of worms may not cause clinical disease as indicated by the fact that two of these birds were actively breeding and feeding young at the time of death. It is possible that the reduced food intake cause by the proventricular changes and the demands of feeding offspring may have resulted in a more rapid decline in a small bird species with fast metabolism.

Moxidectin at the dose recommended on the product used appears to be an effective treatment as faecal exams remain negative for any spiruroid ova and no further deaths have been recorded.

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